UNITED STATES PATENT AND TRADEMARK OFFICE

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10/658,626	09/08/2003	Sanjiv M. Shah	116536-153427	3443

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/658,626	SHAH ET AL.
	Examiner	Art Unit	
	Michael Wilser	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _31 July 2007_.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-56_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-56_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   Claims 1-56 are pending in this application.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Auslander et al. (US 2003/0200457) in view of Singhal et al. (US 6,578,033).

4.   As per Claim 1, Auslander teaches the invention substantially as claimed

including a method of managing a lock utilized by a plurality of threads executing on a

computing device to coordinate access to a shared resource (page 2, paragraph 17)

comprising:

        a. selecting by one of the threads an action to be performed by the thread upon

the lock (page 2, paragraph 20), wherein the action is selected from a group comprising:

                i. acquiring the lock (pages 2 & 3, paragraph 22);

         ii. trying to acquire the lock (pages 2 & 3, paragraph 22); and

         iii. releasing the lock (page 2, paragraph 20);

    b. asynchronously querying and receiving a current state of the lock by the thread and representing each state by a multi-part state value conveying multiple information (page 3, paragraph 22);

    c. speculatively determining by the thread, the next state of the lock, where the next state is the state of the lock if the thread proceeds to perform the selected action and the thread is successful (page 3, paragraph 22); and

    d. attempting to perform by the thread, the selected action to transition the lock from the current state to the speculatively determined next state (page 3, paragraph 22).

5.   However, Auslander does not explicitly discloses that the lock is considered to be in any one of at least four states in any point in time. However, Singhal discloses a method in which a lock can be in any of at least four states at any time (column 5, line 14 & Figure 7).

6.   It would have been obvious to one of ordinary skill in the art at the time of invention to have the lock of at least four states of Singhal's invention be the lock in Auslander's invention. One would have been motivated to use this lock since it is known in the computing arts that a lock can have four or more states.

7.   As per Claim 2, Auslander further discloses that if the transition fails to acquire or

release the lock to repeat the following steps until transition succeeds (page 3,

paragraph 22):

        a. querying the current state of the lock (page 3, paragraph 22);

        b. determining the next state of the lock (page 3, paragraph 22); and

        c. transitioning lock from current state to next determined state (page 3,

paragraph 22).

8.   As per Claim 3, Auslander further discloses that if:

        a. state transition succeeds (page 3, paragraph 22);

        b. selected action is acquiring the lock (page 2, paragraph 21); and

        c. determined next state represents acquisition of the lock (page 3, paragraph

22); then

        d. indicate acquisition of the lock (page 2 & 3, paragraph 22).

9.   As per Claim 4, Auslander further discloses that if:

        a. state transition succeeds (page 3, paragraph 22);

        b. selected action is acquiring the lock (page 2, paragraph 21); and

        c. determined next state does not represent acquisition of the lock (page 3,

paragraph 22); then

        d. add the thread to the end of a queue of threads waiting to acquire the lock

(page 2, paragraph 21);

e. wait to receive notification that thread may acquire the lock (page 2, paragraph 21); and

f. indicate the acquisition of the lock (page 2 & 3, paragraph 22).

10.   As per Claim 5, Auslander further discloses that if:

a. state transition succeeds (page 3, paragraph 22); and

b. selected action is releasing the lock (page 3, paragraph 22); then

c. determine the number of threads in queue waiting to acquire lock utilizing the determined next stet of the lock (page 2, paragraph 21).

11.   As per Claim 6, Auslander further discloses that if the queue includes at least a first thread (page 3, paragraph 22):

a. remove the first thread from the queue (page 3, paragraph 22); and

b. notify the first thread that it has acquired the lock (page 3, paragraph 22).

12.   As per Claim 7, Auslander further discloses that if:

a. selected action is trying to acquire the lock (page 2, paragraph 21); and

b. state transition fails (page 3, paragraph 22); then

c. indicate the lock was unable to be acquired (page 3, paragraph 22).

13.   As per Claim 8, Auslander further discloses that if:

a. state transition succeeds (page 3, paragraph 22); and

b. selected action is trying to acquire the lock (page 2, paragraph 21); then

c. indicate the acquisition of the lock (page 2 & 3, paragraph 22).

14.   As per Claims 9-12, they are rejected for the same reason as Claims 3-6 above.

15.   As per Claim 13, Auslander further discloses that the thread includes:

a. a unique thread identifier (page 2, paragraph 18);

b. next thread field to facilitate access to the next thread in a queue of thread waiting to acquire the lock (page 2, paragraph 18 & 21); and

c. thread is capable of waiting for single lock at a time (page 2, paragraph 20).

16.   As per Claim 14, Auslander further discloses that the action of acquiring the lock includes the inability to timeout or fail to acquire the lock (page 2, paragraph 20).

17.   As per Claim 15, Auslander further discloses that when the locks state may change:

a. querying the current state of the lock (page 3, paragraph 22); and

b. transitioning the lock from the current state to the next determined state of the lock (page 3, paragraph 22).

18.   As per Claim 16, Auslander teaches the invention substantially as claimed including an apparatus comprising:

      a. a processor (page 1, paragraph 1);

      b. a storage medium coupled to the processor, and having stored therein programming instructions to be operated by the processor to implement a lock acquirer to acquire a lock, having a multi-part value (page 2, paragraph 18) including:

      c. a flag value, a first thread value, and a last thread value (page 2, paragraph 18); wherein the lock acquirer performs an acquisition of the lock (page 2, paragraph 20) via

      d. asynchronously querying and receiving a current state of the lock by the lock acquirer and representing each state by a multi-part state value conveying multiple information (page 3, paragraph 22);

      e. speculatively determining by the lock acquirer, the next state of the lock, where the next state is the state of the lock if the lock acquirer proceeds to perform the selected action and the lock acquirer is successful (page 3, paragraph 22); and

      f. attempting to perform by the lock acquirer, the selected action to transition the lock from the current state to the speculatively determined next state (page 3, paragraph 22).

19.   However, Auslander does not explicitly discloses that the lock is considered to be in any one of at least four states in any point in time. However, Singhal discloses a method in which a lock can be in any of at least four states at any time (column 5, line 14 & Figure 7).

20.   It would have been obvious to one of ordinary skill in the art at the time of
invention to have the lock of at least four states of Singhal's invention be the lock in
Auslander's invention. One would have been motivated to use this lock since it is known
in the computing arts that a lock can have four or more states.

21.   As per Claim 17, Auslander further discloses that the lock acquirer is capable of
performing two general actions of acquiring the lock (page 2 & 3, paragraph 22) and
trying to acquire the lock (page 2 &3, paragraph 22) wherein:

        a. state transition fails (page 3, paragraph 22); and

        b. general action is acquiring the lock (page 2 & 3, paragraph 22) then the lock
acquirer is capable of repeating (page 3, paragraph 22) the steps of:

        c. querying the current state of the lock (page 3, paragraph 22);

        d. determining the next state of the lock (page 3, paragraph 22); and

        e. attempting to transition the lock from current state to the next determined state
of the lock (page 3, paragraph 22).

22.   As per Claim 18, Auslander further discloses of indicating that the lock was
unable to be acquired (page 3, paragraph 22).

23.   As per Claim 19, Auslander further discloses of indicating that the lock was
acquired (page 2 & 3, paragraph 22).

24.   As per Claim 20, it is rejected for the same reason as Claim 3 above.

25.   As per Claim 21, Auslander further discloses that if:

    a. state transition fails (page 3, paragraph 22);

    b. general action is acquire the lock (page 2, paragraph 21); and

    c. determined next state does not represent acquisition of the lock (page 3,

paragraph 22); then the lock acquirer is further capable of

    d. adding the thread to the end of a queue of threads waiting to acquire the lock

(page 2, paragraph 21);

    e. waiting to receive notification that the thread may acquire the lock (page

2,paragraph 21); and

    f. indicating the acquisition of the lock (page 2 & 3, paragraph 22).

26.   As per Claim 22, it is rejected for the same reason as Claim 14 above.

27.   As per Claim 23, Auslander teaches the invention substantially as claimed

including an apparatus comprising:

    a. a processor (page 1, paragraph 1);

    b. a storage medium coupled to the processor, and having stored therein

programming instructions to be operated by the processor to implement a lock releaser

to release a lock, having a multi-part value (page 2, paragraph 18) including:

c. a flag value, a first thread value, and a last thread value (page 2, paragraph

18); wherein the lock releaser releases a hold on the lock (page 2, paragraph 20) via

d. asynchronously querying and receiving a current state of the lock by the lock

releaser and representing each state by a multi-part state value conveying multiple

information (page 3, paragraph 22);

e. speculatively determining by the lock releaser, the next state of the lock, where

the next state is the state of the lock if the lock releaser proceeds to perform the

selected action and the lock releaser is successful (page 3, paragraph 22); and

f. attempting to perform by the lock releaser, the selected action to transition the

lock from the current state to the speculatively determined next state (page 3,

paragraph 22).

28.   However, Auslander does not explicitly discloses that the lock is considered to be

in any one of at least four states in any point in time. However, Singhal discloses a

method in which a lock can be in any of at least four states at any time (column 5, line

14 & Figure 7).

29.   It would have been obvious to one of ordinary skill in the art at the time of

invention to have the lock of at least four states of Singhal's invention be the lock in

Auslander's invention. One would have been motivated to use this lock since it is known

in the computing arts that a lock can have four or more states.

30.   As per Claim 24, it is rejected for the same reason as Claim 2 above.

31.   As per Claim 25, Auslander further discloses that if the state transition succeeds
(page 3, paragraph 22), the lock releaser is further capable of determining the number
of threads in a queue waiting to acquire the lock utilizing the determined next state of
the lock (page 2, paragraph 21).

32.   As per Claim 26, it is rejected for the same reason as Claim 6 above.

33.   As per Claim 27, Auslander further discloses that the lock releaser (page 2,
paragraph 20) is capable of removing the first thread from the queue utilizing a thread
having:

    a. a unique thread identifier (page 2, paragraph 18); and

    b. a next thread value to facilitate access to the next thread in the queue (page 2,
paragraph 18 & 21).

34.   As per Claim 28, it is rejected for the same reason as Claim 15 above.

35.   As per Claims 29-43, they are rejected for the same reason as Claims 1-15
above.

36.   As per Claim 44, Auslander teaches the invention substantially as claimed

including a system comprising:

        a. a memory element capable of storing a queue of threads (page 3, paragraph

24);

        b. a unique thread identifier (page 2, paragraph 18);

        c. a next thread value to facilitate access to a next thread in the queue to

coordinate access to a shared resource for threads (page 2, paragraph 18 & 21);

        d. a multi-part state lock conveying multiple information including a flag value, a

first thread value, and a last thread value (page 2, paragraph 18);

        e. a lock acquirer capable of acquiring the lock (page 2, paragraph 20) via;

        f. asynchronously querying and receiving a current state of the lock by the lock

acquirer and representing each state by a multi-part state value conveying multiple

information (page 3, paragraph 22);

        g. speculatively determining by the lock acquirer, the next state of the lock, where

the next state is the state of the lock if the lock acquirer proceeds to perform the

selected action and the lock acquirer is successful (page 3, paragraph 22); and

        h. attempting to perform by the lock acquirer, the selected action to transition the

lock from the current state to the speculatively determined next state (page 3,

paragraph 22).

37.   However, Auslander does not explicitly discloses that the lock is considered to be

in any one of at least four states in any point in time. However, Singhal discloses a

method in which a lock can be in any of at least four states at any time (column 5, line

14 & Figure 7).

38.   It would have been obvious to one of ordinary skill in the art at the time of

invention to have the lock of at least four states of Singhal's invention be the lock in

Auslander's invention. One would have been motivated to use this lock since it is known

in the computing arts that a lock can have four or more states.

39.   As per Claims 45-50, they are rejected for the same reason as Claims 17-22

above.

40.   As per Claim 51, Auslander teaches the invention substantially as claimed

including a system comprising:

        a. a memory element capable of storing a queue of threads (page 3, paragraph

24);

        b. a unique thread identifier (page 2, paragraph 18);

        c. a next thread value to facilitate access to a next thread in the queue to

coordinate access to a shared resource for threads (page 2, paragraph 18 & 21);

        d. a multi-part state lock conveying multiple information including a flag value, a

first thread value, and a last thread value (page 2, paragraph 18);

        e. a lock releaser capable of releasing the lock (page 2, paragraph 20);

f. asynchronously querying and receiving a current state of the lock by the lock releaser and representing each state by a multi-part state value conveying multiple information (page 3, paragraph 22);

g. speculatively determining by the lock releaser, the next state of the lock, where the next state is the state of the lock if the lock releaser proceeds to perform the selected action and the lock releaser is successful (page 3, paragraph 22); and

h. attempting to perform by the lock releaser, the selected action to transition the lock from the current state to the speculatively determined next state (page 3, paragraph 22).

41.   However, Auslander does not explicitly discloses that the lock is considered to be in any one of at least four states in any point in time. However, Singhal discloses a method in which a lock can be in any of at least four states at any time (column 5, line 14 & Figure 7).

42.   It would have been obvious to one of ordinary skill in the art at the time of invention to have the lock of at least four states of Singhal's invention be the lock in Auslander's invention. One would have been motivated to use this lock since it is known in the computing arts that a lock can have four or more states.

43.   As per Claim 52, it is rejected for the same reason as Claim 2 above.

44.   As per Claims 53-54, they are rejected for the same reason as Claims 25-26

above.

45.   As per Claim 55, it is rejected for the same reason as Claim 28 above.

46.   As per Claim 56, Singhal further discloses the next state is one of:

       a. the lock is not held and there are no threads waiting to access the shared

resource (column 7, lines 10-11);

       b. the lock is held and there are no threads waiting to access the shared

resource (column 7, lines 12-13);

       c. the lock is held and there is one thread waiting to access the shared resource

(column 7, lines 14-15); and

       d. the lock is held and there are at least two threads waiting to access the shared

resource (column 10, lines 5-10).

Response to Arguments

47.   Applicant's arguments with respect to claims 1-55 have been considered but are

moot in view of the new ground(s) of rejection.

Conclusion

48.   Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Michael Wilser whose telephone number is (571) 270-

1689. The examiner can normally be reached on Mon-Fri 7:30-5:00 EST (Alt Fridays

Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

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MPW
October 5, 2007

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